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YOUR RESPONSIBILITY:

To protect employees while transporting, transferring, loading and unloading anhydrous ammonia

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WAC 296-826-600

Rule

WAC 296-826-60005

Mounting containers on trucks, semi-trailers and trailers

You must

- Make sure the method for attaching any container to the cradle, frame, or chassis of a vehicle is based on both of the following:
  - Two “g” loading in either direction
  - Using a safety factor of at least 4 based on the maximum strength of the material used.

Note:

Two “g” is either of the following:

- For load support it’s equivalent to 3 times the static weight of the supported articles
- For loading and bending, acceleration, and torsion it’s equivalent to twice the static weight support applied horizontally at the road surface.

You must

- Secure both ends of the hose during transit.
- Follow the requirements in Table 14, Additional Container Mounting Requirements.

-Continued-

WAC 296-826-60005

Mounting containers on trucks, semi-trailers and trailers (continued)

Table 14
Additional Container Mounting Requirements

If you have	Then
"Hold-down" devices	• Anchor the container to the cradle, frame, or chassis so there's no area of unnecessary stress • Lock the container down tightly • Provide stops or anchors to minimize movement between the container and the framing **Note:** Movement could be the result of stopping, starting or changing direction.
Vehicles with cargo tanks designed with stress members instead of a frame	• Support the tank with external cradles suspended at least 120 degrees of the shell circumference • The design calculation needs to include all of the following stressors: – Beam – Shear – Torsion – Bending moment – Acceleration – Any other stresses covered by the code of the cargo tank design.
A liquid withdrawal line installed in the bottom of a container	• Then make sure the connections to the container, including the hose, aren't lower than the lowest horizontal edge of the trailer axle.
A cradle and container that aren't welded together	• Use suitable material between them to eliminate metal-to-metal friction.

Operations

WAC 296-826-600

Rule

WAC 296-826-60010

Mounting containers on farm trucks or trailers for transporting ammonia

You must

- Make sure tanks mounted on farm trucks and trailers meet all of the following:
  - Are securely attached using drawbars and safety chains
  - Follow behind the towing vehicle without swerving
  - Have at least 5 gallons of readily available clean water.
- Do all of the following when mounting containers on farm trucks:
  - Use suitable material between the cradle and the container to eliminate metal-to-metal friction
    - This isn't necessary if the cradle and container are welded together
  - Use stops and hold down devices to prevent displacement.
- Distribute the container's weight, when mounted on 4-wheel farm trucks or trailers, evenly over both axles.

WAC 296-826-60015

Tank car loading or unloading

You must

- Establish a location for tank car loading and unloading operations.
- Assign employees and instruct them in the unloading of tank cars.
- Make sure, when unloading cars, to set the brake and block the wheels.
- Make sure the track of tank siding is level.
- Place caution signs on the track or car to warn approaching persons of loading and unloading operations that are:
  - Kept in place until the car is unloaded and disconnected from discharge connections.
- Make sure these caution signs meet all of the following:
  - Are made of metal or other suitable material
  - Are at least 12 to 15 inches in size
  - Read either “Stop-Tank Car Connected” or “Stop-Men at Work” meeting the following criteria:
    - “Stop” at least 4 inches high
    - All other words at least 2 inches high
    - All with white letters on a blue background.

Operations

WAC 296-826-600

Rule

TRANSFERRING LIQUIDS

WAC 296-826-60020

General specifications

You must

- Get owner authorization to use transfer containers.
- Make sure transfer containers are gauged and filled in either:
  - Open atmospheres

    or
  - Buildings approved for that purpose.
- Make sure pumps used to transfer ammonia meet all of the following:
  - Have a manufacturer's label for ammonia service
  - Are designed for at least 250 psig working pressure
  - Have a constant differential relief valve discharging into the suction port that:
    - Is installed on positive displacement pumps

      and
    - Meets the pump manufacturer's recommendation for the settings and installation
  - Have a pressure gauge graduated zero to 400 psig installed on the discharge side before the relief valve line.
- Make sure plant pipes with shut off valves are located as close as possible to the pump connections.
- Make sure meters used for measuring liquid anhydrous ammonia:
  - Are recommended and labeled for ammonia service by the manufacturer
  - Are designed for a minimum working pressure of 250 psig
  - Incorporate devices that prevent unintended measurement of vapor.

-Continued-

WAC 296-826-60020
General specifications (continued)

You must

- Do the following when transferring ammonia:
  - Maintain ammonia at a temperature suitable for the receiving container
  - Have at least one attendant supervise the transfer from the time connections are made to when disconnection occurs
  - Don't use flammable gases or gases that will react with ammonia, such as air to unload tank cars or transport trucks.
- Make sure compressors used for transferring ammonia meet all of the following:
  - Have a working pressure of at least 250 psig when transferring ammonia.
  - If crank cases of compressors aren't designed to withstand system pressure, then provide protection with a suitable safety relief valve
  - Are connected to plant piping with shut off valves located as close as practical to compressor connections
  - Have a safety relief valve that's both:
    - Large enough to discharge the full capacity of the compressor
      and
    - Connected to the discharge before any shut off valve
  - Have an oil separator on the discharge side, where necessary to prevent contamination
  - Have a drainable liquid trap or other adequate method on the compressor suction to minimize the entry of liquids into the compressor
  - Pressure gauges on the suction and discharge ends graduated to at least one and one-half times the maximum pressure that can develop.
- Protect loading and unloading systems in the event of hose severance by suitable devices where necessary, such as:
  - Backflow check valves

    or
  - Properly sized excess flow valves.

Note:

If such valves aren't practical, remotely operated shut off valves may be installed.

Operations

WAC 296-826-600

Rule

WAC 296-826-60025

Additional requirements for systems mounted on trucks, semi-trailers, and trailers for transporting ammonia

You must

- Make sure the content of vehicle containers is determined by one of the following:
  - Weight
  - Liquid-level gauging devices
  - Meters
  - Other approved methods.
- Use a thermometer well when the content of a container is determined by liquid-level measurement. Make sure of the following:
  - The volume, when converted to weight, doesn't exceed the DOT filling density requirement.
- Protect pumps and compressors against physical damage when mounted on trucks or trailers.
- Unload tank motor vehicles with a water capacity greater than 3,500 gallons at approved locations.

FILLING DENSITIES

WAC 296-826-60030

Nonrefrigerated containers

You must

- Make sure filling densities for nonrefrigerated containers are below or equal to the requirements in Table 15, Filling Densities.

Table 15
Filling Densities

Containers	Aboveground Containers	Underground Containers
Uninsulated	56%	58%
Insulated	57%	----

Note:

For uninsulated, aboveground containers, the 56% corresponds to:

- 82% by volume at -28°F.
- 85% by volume at 5°F
- 87.5% by volume at 30°F
- 90.6% by volume at 60°F.

Operations

WAC 296-826-600

Rule

WAC 296-826-60035

Refrigerated tanks

You must

- Make sure refrigerated tanks aren't liquid full at a liquid temperature so that the vapor pressure is below the "start-to-discharge" pressure setting of the safety relief valve.

WAC 296-826-60040

Welding

You must

- Permit welding only on the saddle plates, lugs, or brackets attached to the container by the manufacturer.